



SEQUENCE LISTING

<110> COSTA E SILVA, OSWALDO DA
VAN THIELEN, NOCHA
CHEN, ROUYING
ISHITANI, MANABU

<120> PHOSPHATASE STRESS-RELATED PROTEINS AND METHODS OF USE
IN PLANTS

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<140> 09/828,302

<141> 2001-04-06

<150> 60/196,001

<151> 2000-04-07

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<170> PatentIn Ver. 2.1

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Met Arg Asp Ser Pro Leu Lys Lys Ser Ser Glu Pro Val Arg Glu Ile
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Ile	Pro	Gln	Phe	Tyr	Phe	Pro	Asn	Gly	Pro	Pro	Pro	Ser	Lys	Asp	Thr
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			180					185					190		
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	210					215					220				
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225					230					235					240
Asp	Gln	Asn	Met	Leu	Ala	Met	Asp	Thr	Ala	Thr	Arg	Val	Phe	Thr	Val
				245					250					255	
Leu	Lys	Gln	Pro	Asp	Lys	Asn	Phe	Leu	Arg	Gln	Glu	Asp	Phe	Arg	Pro
			260					265					270		
Val	Leu	Arg	Glu	Leu	Leu	Leu	Thr	His	Arg	Gly	Leu	Glu	Phe	Leu	His
		275					280					285			
Asp	Thr	Pro	Glu	Phe	Gln	Asp	Arg	Tyr	Ala	Glu	Thr	Val	Ile	Tyr	Arg
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Ile	Phe	Tyr	His	Val	Asn	Arg	Ala	Gly	Asn	Gly	Arg	Leu	Gln	Leu	Arg
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Glu	Leu	Lys	Arg	Ser	Asn	Leu	Ile	Ala	Ala	Leu	Gln	Gln	Val	Asp	Glu
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		355					360					365			
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Tyr	Arg	Ile	Val	Glu	Arg	Ile	Phe	Ser	Gln	Val	Pro	Arg	Lys	Phe	Thr
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Ser	Lys	Val	Ala	Gly	Lys	Met	Gly	Tyr	Glu	Asp	Phe	Val	Trp	Phe	Ile
				405					410					415	
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Gln	Tyr	Phe	Tyr	Glu	Glu	Gln	Leu	His	Arg	Met	Glu	Cys	Met	Ala	Gln
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Thr Asn Asp Lys Thr Ile Lys Leu Trp Lys Val Thr Glu Lys Lys Val
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Asn	Pro	Leu	Ser	Asn	Asn	Met	Met	Leu	Asn	Pro	Lys	Gly	Phe	Ala	Pro			
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Ser	Pro	Asp	Phe	Val	Phe	Pro	Pro	Gly	Gly	Ile	Pro	Ser	Leu	His	Leu			
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Ala	Tyr	Ala	Asn	Ala	His	Ala	Tyr	His	Ile	Asn	Ser	Ile	Ser	Asn	Asn			
				245					250					255				
Ser	Asp	Cys	Glu	Thr	Tyr	Ile	Ser	Ala	Asp	Asp	Leu	Arg	Ile	Asn	Leu			
			260					265					270					
Trp	Asn	Leu	Glu	Val	Ser	Asp	Gln	Ser	Phe	Asn	Ile	Val	Asp	Ile	Lys			
		275					280					285						
Pro	Thr	Asn	Met	Glu	Asp	Leu	Thr	Glu	Val	Ile	Thr	Ser	Ala	Glu	Phe			
	290					295					300							
His	Pro	Ser	His	Cys	Asn	Val	Leu	Ala	Tyr	Ser	Ser	Ser	Lys	Gly	Ser			
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				325					330					335				
Lys	Leu	Phe	Glu	Glu	Thr	Glu	His	Ala	Gly	Ser	Arg	Ser	Phe	Phe	Thr			
			340					345					350					
Glu	Ile	Ile	Ala	Ser	Ile	Ser	Asp	Ile	Lys	Phe	Ala	Arg	Gly	Gly	Arg			
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Tyr	Ile	Leu	Ser	Arg	Asp	Tyr	Met	Thr	Leu	Lys	Leu	Trp	Asp	Val	Asn			
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Ser	Asn	Leu	Phe	Arg	Val	Phe	Gly	Ala	Ala	Thr	Gly	Ser	Glu	Glu	Ala			
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Ser	Thr	Leu	Glu	Ala	Ser	Lys	Thr	Pro	Asn	Arg	Arg	Ile	Val	Thr	Pro			
	450					455					460							

Ile Arg Ala Leu Asp Arg Ile Gln Glu Val Pro His Glu Gly Pro Met
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Cys Asp Leu Leu Trp Ser Asp Pro Asp Asp Arg Cys Gly Trp Gly Ile
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Ser Pro Arg Gly Ala Gly Tyr Thr Phe Gly Gln Asp Ile Ala Glu Gln
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Phe Asn His Thr Asn Gly Leu Ser Leu Val Ala Arg Ala His Gln Leu
225 230 235 240

Val Met Glu Gly Tyr Asn Trp Cys Gln Asp Lys Asn Val Val Thr Val
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Phe Ser Ala Pro Asn Tyr Cys Tyr Arg Cys Gly Asn Met Ala Ala Ile
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Met Glu Ile Asp Glu Thr Met Asn Arg Ser Phe Leu Gln Phe Glu Pro
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Ala Pro Arg Gln Ser Glu Pro Asp Val Thr Arg Lys Thr Pro Asp Tyr
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Phe Leu
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Arg Asp Ser Met Glu Asp Ala His Lys Ala Ile Leu Asn Val Asp Lys
35 40 45

Asn Thr Ser Thr Ser Ile Phe Gly Ile Phe Asp Gly His Gly Gly Lys
50 55 60

Leu Val Ala Lys Phe Cys Ala Lys His Leu His Gln Glu Val Leu Lys
65 70 75 80

Ser Glu Ala Tyr Ala Lys Gly Asp Leu Lys Ala Ser Leu Glu Tyr Ser
85 90 95

Phe Leu Arg Met Asp Glu Met Met Lys Gly Ala Ser Gly Trp Lys Glu
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Leu Gln Ser Leu Glu Glu Thr Ser Ser Gln Leu Asp Lys Leu Gly Asn
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Gly Asn Ser Ser Ser Asn Ala Arg Glu Asp Asp Glu Ser Asp Tyr Ser
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12/20

Tyr Ala Val Leu Thr Glu Ser Asn Asp Ser Asn Leu Ala Thr Lys Lys
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His Lys Tyr Ser Asp Phe Gln Gly Pro Ile Tyr Gly Ser Thr Ala Val
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Val Ala Leu Ile Arg Gly Asn Lys Leu Phe Val Ala Asn Ala Gly Asp
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Ser Arg Cys Ile Met Ser Arg Arg Gly Glu Ala Val Asn Leu Ser Ile
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Asp His Lys Pro Asn Leu Glu His Glu Arg Lys Arg Ile Glu Ser Ala
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Gly Gly Phe Val His Gly Gly Arg Val Asn Gly Ser Leu Asn Leu Thr
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Asp Lys Gln Val Val Thr Cys Cys Pro Asp Val Val Glu Val Asp Leu
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Gly Pro Gly Asp Glu Phe Ile Val Leu Ala Cys Asp Gly Ile Trp Asp
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Val Met Ser Ser Gln Ala Val Val Asp Phe Val Lys Ser Arg Leu Pro
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Thr Thr Lys Thr Leu Ser Ser Leu Cys Glu Glu Ile Leu Asp Tyr Cys
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Gln Lys Tyr Thr His Leu Gly Glu Glu Asn Gly Asp Asn His Asp Pro
20 25 30

Leu Leu Trp His Lys Asp Leu Gly Asp His Ala Ala Gly Gln Phe Ser
35 40 45

Ile	Ala	Ala	Val	Gln	Ala	Asn	Ala	Ile	Leu	Glu	Asp	Met	Val	Gln	Val
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Glu	Thr	Gly	Pro	Phe	Gly	Thr	Phe	Val	Gly	Val	Tyr	Asp	Gly	His	Gly
65					70					75					80
Gly	Pro	Glu	Ala	Ser	Arg	Tyr	Val	Asn	Asp	Ser	Leu	Tyr	Arg	His	Leu
				85					90					95	
Gln	Lys	Phe	Ala	Thr	Gln	His	Gly	Gly	Met	Ser	Ser	Glu	Val	Leu	Gln
			100					105					110		
Gln	Ala	Phe	Lys	Gln	Thr	Glu	Glu	Gly	Phe	Leu	Glu	Ile	Val	Arg	Asp
		115					120					125			
Ser	Trp	Leu	Thr	Lys	Pro	Gln	Ile	Ala	Ala	Val	Gly	Ser	Cys	Cys	Leu
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Val	Gly	Val	Val	Trp	Glu	Cys	Lys	Leu	Tyr	Ile	Ala	Ser	Leu	Gly	Asp
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Ser	Lys	Ala	Val	Leu	Gly	Arg	Phe	Ser	Arg	Asn	Leu	Gln	Ser	Val	Ile
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Ala	Thr	Glu	Ile	Ser	Thr	Glu	His	Asn	Ala	Ser	Val	Glu	Ala	Val	Arg
			180					185					190		
Gln	Asp	Leu	Gln	Ala	Ala	His	Pro	Asp	Asp	Pro	Arg	Ile	Val	Val	Leu
		195					200					205			
Arg	His	Gly	Val	Trp	Arg	Val	Lys	Gly	Leu	Ile	Gln	Val	Ser	Arg	Ser
	210					215					220				
Ile	Gly	Asp	Val	Tyr	Leu	Lys	Lys	Ala	Glu	Phe	Asn	Arg	Glu	Pro	Leu
225					230					235					240
Ile	Gly	Arg	Phe	Arg	Leu	Pro	Glu	Pro	Leu	Gln	Arg	Pro	Val	Met	Ser
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Ala	Glu	Pro	Asp	Ile	Arg	Val	Ile	Asp	Leu	Thr	Pro	Asp	Val	Glu	Phe
			260					265					270		
Val	Ile	Phe	Ala	Ser	Asp	Gly	Leu	Trp	Glu	His	Leu	Ser	Asn	Gln	Glu
		275					280				285				
Ala	Val	Asp	Ile	Val	His	Lys	Tyr	Pro	Arg	Ala	Gly	Ile	Ala	Arg	Gln
	290					295					300				
Leu	Ile	Arg	Tyr	Ala	Leu	His	Glu	Ala	Ala	Lys	Lys	Arg	Glu	Met	Arg
305					310					315					320
Tyr	Ser	Asp	Leu	Lys	Lys	Ile	Glu	Arg	Gly	Ile	Arg	Arg	His	Phe	His
				325					330					335	
Asp	Asp	Ile	Thr	Val	Val	Val	Val	Phe	Leu	Asp	His	Asn	Leu	Val	Ser
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TOO MANY